

**Inventor:** 1)JUNE-DO KIM

**Title:** APPARATUS AND METHOD FOR GENERATING A CALLING  
TONE OF WIRE/WIRELESS TELEPHONE

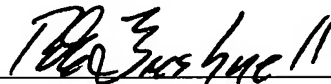
Assistant Commissioner is authorized to charge our Deposit Account No. 02-4943 for any additional charges necessary towards payment of the filing fee for the above-referenced application. Please notify the undersigned attorney of any transaction regarding our Deposit Account.

In view of the above, it is requested that this application be accorded a filing date pursuant to 37 CFR 1.53(b).

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REB/rfc

**TITLE**

**APPARATUS AND METHOD FOR GENERATING A CALLING TONE  
OF WIRE/WIRELESS TELEPHONE**

**CLAIM OF PRIORITY**

[0001] This application makes reference to, incorporates the same herein, and claims all benefits accruing under 35 U.S.C. §119 from my application *APPARATUS AND METHOD PROCESSING CALLING TONE OF WIRE/WIRELESS TELEPHONE* filed with the Korean Industrial Property Office on 13 February 2003 and there duly assigned Serial No. 10-2003-9223.

**BACKGROUND OF INVENTION**

**Technical Field**

[0002] The present invention generally relates to an apparatus and a method for generating a calling tone of a wire/wireless telephone and, more specifically, to an apparatus and a method for generating a calling tone of a wire/wireless telephone so as to sense the distance to a fixed device (fixed body or base of a telephone) according to electric field strength of a received ring signal when the ring signal is received in a portable device of the wire/wireless telephone, and for selectively controlling generation of the calling tone according to the sensed distance.

**Related Art**

[0003] Generally, a wire/wireless telephone is composed of a fixed device and a portable device.

1 The fixed device can directly make a call to the outside by being connected to a wire line, and the  
2 portable device can make a call to the outside by wireless communication with the fixed device.

3 **[0004]** When a call is generated from the outside, the wireless telephone generates a calling tone  
4 in the fixed device, and immediately transmits a ring sensing signal to the portable device at the  
5 same time, thereby processing a ring calling tone in the portable device. Thus, the ring calling tone  
6 simultaneously rings in the fixed device and in the portable device.

7 **[0005]** In this case, ring calling bell sounds simultaneously occur in both the fixed device and  
8 the portable device. If the bell sound of the fixed device is louder than that of the portable device,  
9 it may be difficult to find a position for the portable device when a user wants to answer the phone  
10 with the portable device having the relatively smaller ring calling bell sound.

11 **[0006]** Also, when the wire/wireless telephone is an IT phone having a portable device, it is  
12 supposed to produce a higher sound by using a device having more than forty chords in order to  
13 process a calling tone. However, since the calling tone of the portable device is designed to have  
14 a buzzer or a single-sound bell sound, there may be considerable differences in the sound source.

15 **[0007]** Therefore, different sound sources are created since calling tones of the fixed device and  
16 the portable device are different from each other when receiving a ring signal in the wire/wireless  
17 telephone having such a portable device. As a result, when the fixed device is located near the  
18 portable device, a user can listen to unpleasant calling tones owing to the different calling tones.

19 **[0008]** In a recent telephone using high quality chords, a body or base (the fixed device) has a  
20 calling tone composed of a sound source with more than forty chords and the portable device has  
21 a single-sounded calling tone. Thus, when the fixed device and the portable device simultaneously

1 ring with the calling tone, a user may hear a very unpleasant calling tone.

2 [0009] To solve the above problem, the present applicant filed a Korean Patent Application No.  
3 10-1996-0045743, entitled *METHOD FOR GENERATING RING RECEIVING SOUND IN*  
4 *WIRELESS TELEPHONE*, published on 9 February 1999.

5 [0010] A fixed device of the wire/wireless telephone comprises a ring signal detector, a system  
6 controller, a display, a storage, a key input unit, a dual-tone multi-frequency (DTMF) generator,  
7 first/second/third amplifiers, a wireless modem, a speaker, a microphone, a hook switch, and a  
8 voice processor.

9 [0011] The ring signal detector detects a ring signal received from a local line, and supplies the  
10 detected ring receiving detection signal to the system controller.

11 [0012] The system controller processes a ring calling tone according to the ring receiving  
12 detection signal supplied from the ring signal detector, outputs the ring calling tone to the speaker  
13 through the first amplifier, and controls transmission of wireless data for a ring calling tone  
14 processing control signal to the portable device through the third amplifier and the wireless  
15 modem. The system controller processes a ring calling tone during ring-on time in the ring  
16 receiving detection signal, controls output of the ring calling tone through the first amplifier and  
17 the speaker, and controls transmission of a ring calling tone processing control signal to the  
18 portable device through the wireless modem during a ring-off time (idle period) of the ring  
19 receiving detection signal. In addition, the system controller controls processing of a  
20 single-sounded ring calling tone or a high-chord ring calling tone with more than forty chords  
21 according to the kind of wire/wireless telephone.

1     **[0013]**   The storage unit comprises a read-only memory (ROM) storing various programs and  
2     a random access memory (RAM) temporarily storing data generated while performing a program,  
3     and has an area for setting various functions.

4     **[0014]**   The key input unit has keys for inputting various functions and control commands and  
5     number keys for performing a dialing function, and supplies a key selection input signal from a  
6     user to the system controller.

7     **[0015]**   The display displays various processing and operating states in accordance with a key  
8     input signal inputted from the key input unit under control of the system controller.

9     **[0016]**   The DTMF generator generates a DTMF signal corresponding to the key input signal  
10    inputted through the key input unit by the user under control of the system controller, and supplies  
11    the DTMF signal to the voice processor.

12    **[0017]**   The voice processor processes a voice signal from a caller received through the local line  
13    to output the voice signal through the speaker, and processes a voice signal inputted through the  
14    microphone to transmit the voice signal to the other party through the local line.

15    **[0018]**   The first amplifier amplifies a calling tone processing signal generated in the system  
16    controller and the voice signal processed in the voice processor to a certain level, and outputs the  
17    amplified signals through the speaker.

18    **[0019]**   The second amplifier amplifies the voice signal of the user inputted through the  
19    microphone to a certain level, and supplies the amplified signal to the voice processor.

20    **[0020]**   The third amplifier amplifies the calling tone processing control signal generated in the  
21    system controller to a certain level, supplies the amplified signal to the wireless modem, and

1 amplifies a demodulated voice signal and various data supplied from the wireless modem to a  
2 certain level to output the amplified signal and the data.

3 **[0021]** The wireless modem band-modulates a signal inputted through the third amplifier,  
4 transmits the modulated signal to the portable device through an antenna, and demodulates a signal  
5 transmitted from the portable device to a voice band signal. It then supplies the demodulated  
6 signal to the third amplifier. The wireless modem receives a radio frequency (RF) signal  
7 transmitted from the portable device by means of an RF transceiving module included therein,  
8 modulates the various signals and the data supplied through the third amplifier to an RF signal, and  
9 then transmits the RF signal to the portable device.

10 **[0022]** A portable device of a wire/wireless telephone comprises a wireless modem, a third  
11 amplifier, a system controller, a display, a storage unit, a key input unit, first/second amplifiers,  
12 a speaker, and a microphone.

13 **[0023]** The system controller controls overall operations of the portable device, receives the ring  
14 calling tone processing control signal from the fixed device, and controls ringing of the ring calling  
15 tone during an idle period of a ring signal.

16 **[0024]** The storage unit stores an identification (ID) of the portable device and various  
17 programs, and temporarily stores various data generated while executing the programs under  
18 control of the system controller.

19 **[0025]** The key input unit has number keys for performing various functions and a dialing  
20 function, and supplies to the system controller a key input signal inputted according to user  
21 selection.

1     **[0026]**     The third amplifier amplifies a voice signal and various transceiving data to a  
2     predetermined level, and outputs the amplified signal and the data. The first and second amplifiers  
3     amplify a processed calling tone and a voice signal to a certain level so as to output the calling tone  
4     and the signal through the speaker, and amplifies a voice signal of a user inputted through the  
5     microphone to a certain level in order to transmit the amplified signal to the fixed device through  
6     the wireless modem.

7     **[0027]**     The wireless modem modulates a voice signal to be transmitted under control of the  
8     system controller by including an RF transceiving module, transmits the modulated signal to the  
9     fixed device through an antenna as an RF signal, demodulates various signals received through the  
10    antenna, and then supplies the demodulated signals to the third amplifier.

11   **[0028]**    A calling tone processing operation using the wire/wireless telephone in accordance with  
12   a configuration such as that discussed above will now be described.

13   **[0029]**    When the fixed device is in a standby state, it is determined whether the ring signal is  
14   detected by the ring signal detector.

15   **[0030]**    If the ring signal is not detected through a local line, the fixed device maintains the  
16   standby state and continuously checks for reception of the ring signal. If the ring signal is detected,  
17   the system controller of the fixed device generates a bell sound or a melody sound as a calling tone  
18   during a ring-on time of the detected ring signal in order to inform the user of a ring receiving  
19   signal.

20   **[0031]**    While the calling tone is generated, it is determined whether a ring-off time (idle period)  
21   is detected from the detected ring signal.

1     **[0032]**     If the idle period of the ring signal is not detected, the calling tone is continuously  
2     generated. In this case, the ring signal is received from the local line and has ring-on and ring-off  
3     time periods, thereby generating a ring calling tone during the ring-on time period and stopping  
4     the generation of the ring calling tone during the ring-off time period. The generation of the ring  
5     calling tone is repeated during the ring-on time period so that the user can hear the ring calling  
6     tone.

7     **[0033]**     However, if the idle period of the ring signal is detected from the detected ring signal,  
8     wireless data for the ring calling tone generating control signal is transmitted to the portable device  
9     during the idle period of the ring signal by controlling the RF transceiving module of the wireless  
10    modem.

11   **[0034]**     At this point, it is determined whether the hook switch of the fixed device is turned off.  
12   If it is determined that the hook switch is turned off, transmission of the wireless data for the ring  
13   calling tone generating control signal to the portable device is disabled. Then, a call is made with  
14   a caller by connecting a speech path with the caller through the local line.

15   **[0035]**     After that, it is determined whether the hook switch is turned on during telephone  
16   conversation. If it is determined that the hook switch is turned on, the call is completed to initialize  
17   the fixed device. In other words, the fixed device is converted into the standby state.

18   **[0036]**     If it is not determined that the hook switch is turned off, the wireless data for the ring  
19   calling tone generating control signal transmitted from the fixed device is received through the RF  
20   transceiving module of the wireless modem, and is supplied to the system controller of the portable  
21   device.



1     **[0037]**   Then, the system controller controls outputting of a calling tone, such as a bell sound or  
2     a melody sound, through the speaker according to a ring receiving control signal transmitted from  
3     the fixed device during the idle period of the ring signal.

4     **[0038]**   As in the case above, after ringing of the ring calling tone in the fixed device during the  
5     ring-on time period of the ring signal and ringing of the ring calling tone in the portable device  
6     during the idle period (ring-off time), the system controller of the fixed device determines whether  
7     the hook switch is turned off in the fixed device or the portable device. At this point, if the hook  
8     switch is turned on, that is, the user does not answer the phone, the calling tone is continuously  
9     generated in the fixed device and the portable device during the ring-on and ring-off time periods.

10    **[0039]**   Finally, a method for processing the calling tone of the wire/wireless telephone processes  
11    the calling tone in the fixed device and the portable device with the use of the ring-on and ring-off  
12    time periods of the detected ring signal.

13    **[0040]**   However, such a method for processing the calling tone of the wire/wireless telephone  
14    has different calling tones between a body (fixed device) and the portable device while an  
15    incoming call is generated in the wire/wireless telephone having the portable device, thereby  
16    generating different sound sources. Thus, when the fixed device is located near the portable  
17    device, a user may hear unpleasant calling tones due to the different calling tones.

18    **[0041]**   Also, in a recent telephone using high quality chords, if the body has a calling tone  
19    having forty chords and the portable device has a single-sound calling tone, there is a problem.

20    **[0042]**   Furthermore, when calling tones are generated in the fixed device and the portable device  
21    in turn regardless of the distance between the portable device and the fixed device, the fixed device

1 generates a high-chord calling tone and the portable device generates a single-sound calling tone.

2 As a result, the user can become very annoyed by different calling tones.

3 **[0043]** The following patents are considered to be generally pertinent to the present invention,  
4 but are burdened by the disadvantages set forth above: U.S. Patent No. 6,484,027 to Mauney *et al.*,  
5 entitled *ENHANCED WIRELESS HANDSET, INCLUDING DIRECT HANDSET-TO-HANDSET*  
6 *COMMUNICATION MODE*, issued on November 19, 2002; U.S. Patent No. 6,473,628 to Kuno  
7 *et al.*, entitled *TELEPHONE SET*, issued on October 29, 2002; U.S. Patent No. 5,170,172 to  
8 Weinstein, entitled *ELECTRONIC ASSEMBLY FOR RANGE FINDING USING RADIO WAVE*  
9 *SIGNAL STRENGTH*, issued on December 8, 1992; U.S. Patent No. 4,310,722 to Schaible, entitled  
10 *MOBILE RADIOTELEPHONE STATION TWO-WAY RANGING SYSTEM*, issued on January 12,  
11 1982; and U.S. Patent No. 4,229,620 to Schaible, entitled *MOBILE RADIOTELEPHONE STATION*  
12 *TWO-WAY RANGING SYSTEM*, issued on October 21, 1980.

### 13 SUMMARY OF THE INVENTION

14 **[0044]** It is, therefore, an object of the present invention to provide an apparatus and a method  
15 for processing a calling tone of a wire/wireless telephone so as to selectively generate the calling  
16 tone according to a sensed distance by sensing the distance between a portable device and a fixed  
17 device.

18 **[0045]** Also, it is another object of the present invention to provide an apparatus and a method  
19 for processing a calling tone of a wire/wireless telephone so as to reduce user inconvenience due  
20 to disharmonious melody chords by generating a calling tone in the fixed device only when the

1 fixed device and the portable device are located within a set distance.

2 **[0046]** To accomplish the above objects, according to one embodiment of the invention, an  
3 apparatus for processing a calling tone of a wire/wireless telephone comprises: a detector for  
4 detecting field strength of a received ring receiving generation control signal when the ring  
5 receiving generation control signal is received from the fixed device by receiving a ring signal; a  
6 distance measurer for measuring distance to the fixed device by using the electric field strength  
7 detected from the detector; and a controller for comparing the distance measured by the distance  
8 measurer with a preset reference distance, and for controlling generation of a melody sound source  
9 for a received ring according to a comparison result.

10 **[0047]** In addition, it is possible to include a storage unit storing many preset electric field  
11 strength values and distance values in accordance with the electric field strength values. The  
12 controller controls disabling of the generation of the melody sound when the distance measured  
13 by the distance measurer is less than the preset reference distance, and generates the melody sound  
14 when the measured distance is not less than the preset reference distance.

15 **[0048]** According to another embodiment of the invention, an apparatus for processing a calling  
16 tone of a wire/wireless telephone comprises: a receiver for receiving a wireless signal for a ring  
17 receiving generation control signal transmitted from a fixed device; a detector for detecting electric  
18 field strength for the ring receiving generation control signal received from the receiver; a distance  
19 measurer for comparing the field strength detected from the detector with many preset field  
20 strength values, and for measuring distance to the fixed device; a controller for controlling to  
21 disabling generation of the melody sound when the distance measured by the distance measurer

1 is less than a preset reference distance, and for generating the melody sound when the measured  
2 distance is not less than the preset reference distance, and then generating a receiving message  
3 display control signal regardless of the measured distance; a display for displaying a ring receiving  
4 message according to a ring receiving message generation signal as a result of a ring receiving  
5 message generation control signal generated in the controller; and a storage unit for storing the  
6 preset electric field strength values and distance values corresponding to the electric field strength  
7 values.

8 **[0049]** According to a further embodiment of the invention, an apparatus for processing a calling  
9 tone of a wire/wireless telephone comprises: a key input unit for supplying a key input signal to  
10 select one of an automatic mode and a manual mode according to user selection; a detector for  
11 detecting field strength of a ring receiving generation control signal when the ring receiving  
12 generation control signal is received from the fixed device after the automatic mode is set by the  
13 key input unit and a ring is received; a distance measurer for measuring distance to the fixed device  
14 by using the electric field strength detected by the detector; and a controller for comparing the  
15 distance measured by the distance measurer with a preset reference distance, and for controlling  
16 whether to generate a melody sound for the received ring according to the comparison result.

17 **[0050]** The manual mode of the key input unit can include a first selection mode for resetting  
18 of the preset reference distance by a user, and a second selection mode for generating the melody  
19 sound through the controller during the time when the ring is received regardless of the distance  
20 measured by the distance measurer.

21 **[0051]** If the user selects the manual mode through the key input unit, the controller compares

1 the distance measured by the distance measurer with the reference distance reset by the user  
2 through the manual mode, and controls generation of the melody sound for the received ring  
3 according to the comparison result.

4 **[0052]** When the distance measured by the distance measurer is less than the preset reference  
5 distance, the controller controls disabling of the generation of the melody sound, and generates the  
6 melody sound when the measured distance is more than the preset reference distance.

7 **[0053]** Moreover, in an apparatus for processing a calling tone of a wire/wireless telephone in  
8 accordance with another embodiment of the present invention, the apparatus comprises: a key  
9 input unit for supplying a key input signal to select one of an automatic mode and a manual mode  
10 according to user selection; a detector for detecting electric field strength of a ring receiving  
11 generation control signal when the ring receiving generation control signal is received from the  
12 fixed device after the automatic mode is set by the key input unit and a ring is received; a distance  
13 measurer for comparing the field strength detected by the detector with a plurality of preset electric  
14 field strength values, and for measuring distance to the fixed device; a controller for comparing  
15 the distance measured by the distance measurer with a preset reference distance, and for  
16 controlling generation of a melody sound for a received ring according to the comparison result;  
17 a storage unit for storing preset electric field strength values and distance values corresponding  
18 to the electric field strength values when the automatic mode is selected through the key input unit,  
19 and for storing a reference distance value selected by a user under control of the controller when  
20 the manual mode is selected through the key input unit; and a display unit for displaying a ring  
21 receiving message according to a receiving message generation signal generated in the controller

1 regardless of automatic mode or manual mode selection through the key input unit and the distance  
2 measured by the distance measurer.

3 **[0054]** According to another embodiment of the invention, an apparatus for processing a calling  
4 tone of a wire/wireless telephone comprises: a fixed device for receiving a ring signal through a  
5 local line, for generating a receiving melody sound according to the received ring signal, and for  
6 wirelessly transmitting an RF signal in accordance with a ring receiving generation control signal  
7 at the same time; and a portable device for receiving the RF signal in accordance with the ring  
8 receiving generation control signal transmitted by the fixed device, for measuring distance to the  
9 fixed device according to a detected electric field strength by detecting the electric field strength  
10 of the received RF signal, and for selectively processing a calling tone according to the measured  
11 distance to the fixed device; wherein the portable device disables the processing of the calling tone  
12 when the measured distance is less than a preset distance, and processes the calling tone when the  
13 measured distance is not less than the reference distance.

14 **[0055]** The portable device can include: a receiver for receiving a wireless signal corresponding  
15 to the ring receiving generation control signal transmitted by the fixed device; a detector for  
16 detecting electric field strength of the ring receiving generation control signal received from the  
17 receiver; a distance measurer for comparing the electric field strength detected by the detector with  
18 preset electric field strength values, and for measuring distance to the fixed device; a controller  
19 for controlling disabling of generation of a melody sound when the distance measured by the  
20 distance measurer is less than a preset reference distance, for generating the melody sound when  
21 the measured distance is not less than the preset reference distance, and for generating a receiving

1 message display control signal regardless of the measured distance; a display for displaying a ring  
2 receiving message according to a ring receiving message generation control signal generated in the  
3 controller; and a storage unit for storing the preset electric field strength values and distance values  
4 corresponding to the electric field strength values.

5 **[0056]** Furthermore, the portable device can include: a key input unit for supplying a key input  
6 signal for selecting one of an automatic mode and a manual mode according to user selection; a  
7 detector for detecting electric field strength of a ring receiving generation control signal when the  
8 ring receiving generation control signal is received from the fixed device after the automatic mode  
9 is set by the key input unit and a ring is received; a distance measurer for comparing the electric  
10 field strength detected by the detector with a plurality of preset field strength values, and for  
11 measuring distance to the fixed device; a controller for comparing the distance measured by the  
12 distance measurer with a preset reference distance, and for controlling generation of a melody  
13 sound for the received ring according to the comparison result; a storage unit for storing the preset  
14 electric field strength values and distance values corresponding to the electric field strength values  
15 when the automatic mode is selected through the key input unit, and for storing a reference  
16 distance value selected by a user under control of the controller when the manual mode is selected  
17 through the key input unit; and a display unit for displaying a ring receiving message according  
18 to a receiving message generation signal generated by the controller regardless of automatic mode  
19 or manual mode selection through the key input unit and the measured distance.

20 **[0057]** According to an embodiment of the invention, a method of processing a calling tone of  
21 a wire/wireless telephone comprises the steps of: detecting electric field strength of a ring

1 receiving generation control signal when the ring receiving generation control signal is received  
2 from a fixed device after a ring signal is received; measuring distance to the fixed device by using  
3 the detected electric field strength; and comparing the measured distance with a preset reference  
4 distance, and selectively generating a melody sound for a received ring according to the  
5 comparison result.

6 **[0058]** According to another embodiment of the invention, a method of processing a calling tone  
7 of a wire/wireless telephone comprises the steps of: receiving a wireless signal comprising a ring  
8 receiving generation control signal transmitted from a fixed device; detecting electric field strength  
9 for the received ring receiving generation control signal; comparing the detected electric field  
10 strength with a plurality of preset electric field strength values, and measuring distance to the  
11 fixed device; controlling disabling of generation of a melody sound when the measured distance  
12 is less than a preset reference distance, generating the melody sound when the measured distance  
13 is not less than the preset reference distance, and generating a receiving message display control  
14 signal regardless of the measured distance; and displaying a ring receiving message according to  
15 a ring receiving message generation signal resulting from a generated ring receiving message  
16 generation control signal.

17 **[0059]** According to another embodiment of the invention, a method of processing a ring calling  
18 tone of a wire/wireless telephone comprises the steps of: executing a mode selection step to supply  
19 a key input signal for selecting one of an automatic mode and a manual mode according to user  
20 selection; detecting electric field strength of a ring receiving generation control signal when the  
21 ring receiving generation control signal is received from the fixed device after the automatic mode



1 is selected in the mode selection step and a ring is received; measuring distance to the fixed device  
2 by using the detected electric field strength; and comparing the measured distance with a preset  
3 reference distance, and selectively processing a calling tone for the received ring according to a  
4 the comparison result.

5 **[0060]** According to another embodiment of the invention, a method of processing a calling tone  
6 of a wire/wireless telephone comprises the steps of: executing a mode selection step to select one  
7 of an automatic mode and a manual mode according to user selection; detecting electric field  
8 strength of a received ring receiving generation control signal when the ring receiving generation  
9 control signal is received from a fixed device after a ring is received and the automatic mode is set  
10 by a user; comparing the detected electric field strength with preset field strength values, and  
11 measuring distance to the fixed device; comparing the measured distance with a preset reference  
12 distance, and selectively processing a calling tone for the received ring according to the  
13 comparison result; and displaying a ring receiving message according to a generated receiving  
14 message generation signal regardless of automatic mode or manual mode selection in the mode  
15 selection step and the measured distance.

16 **[0061]** According to another embodiment of the invention, a method of processing a calling tone  
17 of a wire/wireless telephone comprises the steps of: receiving a ring signal through a local line  
18 connected to the fixed device; processing a calling tone according to the received ring signal;  
19 wirelessly transmitting an RF signal corresponding to a ring receiving generation control signal  
20 to the portable device at the same time; receiving the RF signal corresponding to the ring receiving  
21 generation control signal transmitted from the fixed device; measuring distance to the fixed device

1 according to detection of the electric field strength of the received RF signal; and selectively  
2 processing the calling tone according to the measured distance to the fixed device; wherein the step  
3 of processing the calling tone comprises disabling of the processing of the calling tone when the  
4 measured distance is less than a preset reference distance, and processing of the calling tone when  
5 the measured distance is not less than the reference distance.

6 **[0062]** The step of selectively processing the calling tone comprises the sub-steps of: receiving  
7 a wireless signal corresponding to a ring receiving generation control signal transmitted by the  
8 fixed device; detecting electric field strength of the received ring receiving generation control  
9 signal; comparing the detected field strength with a plurality of preset electric field strength values,  
10 and measuring distance to the fixed device; controlling disabling of generation of a melody sound  
11 when the measured distance is less than a preset reference distance, generating the melody sound  
12 source when the measured distance is not less than the preset reference distance, and generating  
13 a receiving message display control signal regardless of the measured distance; and displaying a  
14 ring receiving message according to a ring receiving message generation signal resulting from a  
15 generated ring receiving message generation control signal.

16 **[0063]** Furthermore, the step of selectively processing the calling tone comprises the sub-steps  
17 of: selecting one of an automatic mode and a manual mode according to user selection; detecting  
18 electric field strength of a received ring receiving generation control signal when the ring receiving  
19 generation control signal is received from the fixed device after a ring is received and the  
20 automatic mode is set by a user; comparing the detected electric field strength with a plurality of  
21 preset electric field strength values, and measuring distance to the fixed device; comparing the

1 measured distance with a preset reference distance, and selectively processing a calling tone of the  
2 received ring according to the comparison result; and displaying a ring receiving message  
3 according to the generated receiving message generation signal regardless of automatic mode or  
4 manual mode selection in the mode selection step and the measured distance.

### 5 BRIEF DESCRIPTION OF THE DRAWINGS

6 [0064] A more complete appreciation of the invention, and many of the attendant advantages  
7 thereof, will be readily apparent as the same becomes better understood by reference to the  
8 following detailed description when considered in conjunction with the accompanying drawings  
9 in which like reference symbols indicate the same or similar components, wherein:

10 [0065] Fig. 1 is a block diagram of a fixed device in a wire/wireless telephone;

11 [0066] Fig. 2 is a block diagram of a portable device in a wire/wireless telephone;

12 [0067] Fig. 3 is a flowchart of a method of processing a calling tone of a wire/wireless  
13 telephone;

14 [0068] Fig. 4 is a diagram illustrating an on/off time period of a ring signal, showing the ring  
15 signal received in a wire/wireless telephone;

16 [0069] Fig. 5 is a block diagram of an apparatus for processing a calling tone in a portable  
17 device of a wire/wireless telephone in accordance with the present invention; and

18 [0070] Fig. 6 is a flowchart of a method of processing a calling tone of a wire/wireless telephone  
19 in accordance with the present invention.

**DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS**

[0071] Reference will now be made in detail to exemplary embodiments of the present invention, which are illustrated in the accompanying drawings.

[0072] Fig. 1 is a block diagram of a fixed device in a wire/wireless telephone, and Fig. 2 is a block diagram of a portable device in a wire/wireless telephone.

[0073] First, a fixed device 100 of a wire/wireless telephone comprises a ring signal detector 101, a system controller 102, a display 103, a storage 104, a key input unit 105, a DTMF generator 106, first/second/third amplifiers 107, 108, 109, a wireless modem 110, a speaker 111, a microphone 112, a hook switch 113, and a voice processor 114.

[0074] The ring signal detector 101 detects a ring signal received from a local line, and supplies a ring receiving detection signal to the system controller 102.

[0075] The system controller 102 processes a ring calling tone according to the ring receiving detection signal supplied by the ring signal detector 101, outputs the ring calling tone to the speaker 111 through the first amplifier 107, and controls transmission of wireless data for a ring calling tone processing control signal to the portable device 200 of Fig. 2 through the third amplifier 109 and the wireless modem 110. The system controller 102 processes a ring calling tone during a ring-on time in the ring receiving detection signal, controls output of the ring calling tone through the first amplifier 107 and the speaker 111, and controls transmission of a ring calling tone processing control signal to the portable device 200 through the wireless modem 110 during a ring-off time or idle period of the ring receiving detection signal. In addition, the system controller 102 controls processing of a single-sound ring calling tone or a high-chord ring calling

1 tone with more than 40 chords according to the type of wire/wireless telephone.

2 **[0076]** The storage 104 comprises a read-only memory (ROM) for storing various programs and  
3 a random access memory (RAM) for temporarily storing data generated while performing a  
4 program, and has an area for setting various functions.

5 **[0077]** The key input unit 105 has keys for inputting various functions and control commands,  
6 and number keys for performing a dialing function, and supplies a key selection input signal of a  
7 user to the system controller 102.

8 **[0078]** The display 103 displays various processing and operating states in accordance with a  
9 key input signal inputted from the key input unit 105 under control of the system controller 102.

10 **[0079]** The DTMF generator 106 generates a DTMF signal corresponding to the key input signal  
11 inputted by the user through the key input unit 105 under control of the system controller 102, and  
12 supplies the DTMF signal to the voice processor 114.

13 **[0080]** The voice processor 114 processes a voice signal of a caller received through the local  
14 line, outputs the voice signal through the speaker 111, and processes a voice signal inputted  
15 through the microphone 112 so as to transmit the voice signal to the other party through the local  
16 line.

17 **[0081]** The first amplifier 107 amplifies a calling tone processing signal generated in the system  
18 controller 102 and the voice signal processed in the voice processor 114 to a certain level, and  
19 outputs the amplified signals through the speaker 111.

20 **[0082]** The second amplifier 108 amplifies the voice signal of the user inputted through the  
21 microphone 112 to a certain level, and supplies the amplified signal to the voice processor 114.

1     **[0083]**   The third amplifier 109 amplifies the calling tone processing control signal generated  
2     in the system controller 102 to a certain level, supplies the amplified signal to the wireless modem  
3     110, and amplifies a demodulated voice signal and various data supplied from the wireless modem  
4     110 to a certain level to output the amplified signal and the data.

5     **[0084]**   The wireless modem 110 band-modulates a signal inputted through the third amplifier  
6     109, transmits the modulated signal to the portable device 200 through an antenna, demodulates  
7     a signal transmitted from the portable device 200 to form a voice band signal, and then supplies  
8     the demodulated signal to the third amplifier 109. The wireless modem 110 receives an RF signal  
9     transmitted by the portable device 200 by including an RF transceiving module, modulates the  
10    various signals and the data supplied through the third amplifier 109 to form an RF signal, and  
11    then transmits the RF signal to the portable device 200.

12   **[0085]**   A portable device 200 of a wire/wireless telephone, as seen in Fig.2, comprises a wireless  
13    modem 201, a third amplifier 202, a system controller 203, a display 204, a storage 205, a key  
14    input unit 206, first/second amplifiers 207, 208, a speaker 209, and a microphone 210.

15   **[0086]**   The system controller 203 controls overall operation of the portable device 200, receives  
16    the ring calling tone processing control signal from the fixed device 100 described in Fig. 1, and  
17    controls generation of the ring calling tone during an idle period of a ring signal.

18   **[0087]**   The storage 205 stores an ID of the portable device 200 and various programs, and  
19    temporarily stores various data generated during execution of the programs under control of the  
20    system controller 103.

21   **[0088]**   The key input unit 206 has number keys for performing various functions and a dialing

1 function, and supplies a key input signal inputted according to user selection to the system  
2 controller 203.

3 **[0089]** The third amplifier 202 amplifies a voice signal and various transceiving data to a  
4 predetermined level, and outputs the amplified signal and the data. The first amplifier 207  
5 amplifies a processed calling tone and a voice signal to a certain level for output of the calling tone  
6 and the voice signal through the speaker 209, and the second amplifier 208 amplifies a voice signal  
7 of a user inputted through the microphone 210 to a certain level in order to transmit the amplified  
8 signal to the fixed device 100 through the wireless modem 201.

9 **[0090]** The wireless modem 201 modulates a voice signal to be transmitted under control of the  
10 system controller 203 by means of an RF transceiving module included therein, transmits the  
11 modulated signal to the fixed device 100 through an antenna as an RF signal, demodulates various  
12 signals received through the antenna, and then supplies the demodulated signals to the third  
13 amplifier 109.

14 **[0091]** A calling tone processing operation using the wire/wireless telephone in accordance with  
15 the above will now be described with reference to the accompanying drawings.

16 **[0092]** Fig. 3 is a flowchart of a method of processing a calling tone of a wire/wireless  
17 telephone, and Fig. 4 is a diagram illustrating an on/off time period of a ring signal, showing the  
18 ring signal received from a wire/wireless telephone.

19 **[0093]** First, when the fixed device 100 described in Fig. 1 is in a standby state (S101), it is  
20 determined whether a ring signal from the ring signal detector 101 is detected (S102).

21 **[0094]** If the ring signal is not detected through a local line, the fixed device 100 maintains the

1 standby state and continuously checks for reception of the ring signal. If the ring signal is detected,  
2 the system controller 102 of the fixed device 100 described in Fig. 1 generates a bell sound or a  
3 melody sound as a calling tone during a ring-on time of the detected ring signal, as shown in Fig.  
4 4, in order to inform the user of a ring receiving signal (S103).

5 **[0095]** When the calling tone is generated, it is determined whether a ring-off time (idle period)  
6 is detected from the detected ring signal, as shown in Fig. 4 (S104).

7 **[0096]** If the idle period of the ring signal is not detected, the calling tone is continuously  
8 generated. As shown in Fig. 4, the ring signal is received from the local line and has ring-on time  
9 and ring-off time periods, thereby generally generating a ring calling tone during the ring-on time  
10 period and stopping the generation of the ring calling tone during the ring-off time period. The  
11 operation of generating the ring calling tone is repeated during the ring-on time period so that the  
12 user can hear the ring calling tone.

13 **[0097]** However, in step S104, if the idle period of the ring signal is detected from the detected  
14 ring signal, wireless data for the ring calling tone generating control signal are transmitted to the  
15 portable device 200 during the idle period of the ring signal by controlling the RF transceiving  
16 module (not shown) of the wireless modem 110 (S105).

17 **[0098]** At this point, it is determined whether the hook switch 113 of the fixed device 100 is  
18 turned off (S106). If it is sensed that the hook switch is turned off, transmission of the wireless  
19 data for the ring calling tone generating control signal to the portable device 200 is disabled. Then,  
20 a call is made to a caller by connecting a speech path with the caller through the local line (S107).

21 **[0099]** Subsequently, it is determined whether the hook switch 113 is turned on during a



1 telephone conversation (S108). If it is determined that the hook switch 113 is turned on, the call  
2 is completed so as to initialize the fixed device 100. In another words, the fixed device 100 is  
3 placed in the standby state (S109).

4 **[0100]** If it is not determined that the hook switch 113 is turned off in step S106, the wireless  
5 data for the ring calling tone generating control signal transmitted from the fixed device 100 is  
6 received through the RF transceiving module of the wireless modem 201, and is supplied to the  
7 system controller 203 of the portable device 200 (S110).

8 **[0101]** Then, the system controller 203 controls output of a calling tone, such as a bell sound  
9 or a melody sound, through the speaker 209 according to a ring receiving control signal transmitted  
10 from the fixed device 100 during the idle period of the ring signal (S111).

11 **[0102]** As described above, after generating the ring calling tone in the fixed device 100 during  
12 the ring-on time period of the ring signal and generating the ring calling tone in the portable device  
13 200 during the idle period (ring-off time), the system controller 102 of the fixed device 100  
14 determines whether the hook switch is turned off in the fixed device 100 or the portable device  
15 200. At this point, if the hook switch is turned on (that is, the user does not answer the phone),  
16 the calling tone is continuously generated in the fixed device 100 and the portable device 200  
17 during the ring-on time and ring-off time periods.

18 **[0103]** Finally, the method of processing the calling tone of the wire/wireless telephone  
19 processes the calling tone in the fixed device 100 and the portable device 200 with the use of the  
20 ring-on and ring-off time periods of the detected ring signal.

21 **[0104]** However, such method of processing the calling tone of the wire/wireless telephone has

1 different calling tones between the fixed device 100 and the portable device 200 while an incoming  
2 call is generated in the wire/wireless telephone having the portable device 200, thereby generating  
3 different sounds. Thus, when the fixed device 100 is located near the portable device 200, a user  
4 may hear unpleasant sounds due to the different calling tones.

5 **[0105]** Also, in a recent telephone using high quality chords, if the body or fixed device 100 has  
6 a calling tone of 40 chords and the portable device has a single-sound calling tone, a problem  
7 results.

8 **[0106]** Furthermore, when calling tones are generated in the fixed device 100 and the portable  
9 device 200 regardless of distance between the portable device 200 and the fixed device 100, the  
10 fixed device 100 generates a high-chord calling tone and the portable device 200 generates a  
11 single-sound calling tone. As a result, the user can be very annoyed by different calling tones.

12 **[0107]** Fig. 5 is a block diagram of an apparatus for processing a calling tone in a portable  
13 device of a wire/wireless telephone in accordance with the present invention. With reference to  
14 Fig. 5, the portable device 300 comprises a wireless modem 301, a third amplifier 302, an RSSI  
15 detector 303, a system controller 304, a display 305, a storage 306, a key input unit 307,  
16 first/second amplifiers 308, 309, a speaker 310, and a microphone 311.

17 **[0108]** The wireless modem 301 includes an RF transceiving module, modulates a voice signal  
18 to be transmitted under control of the system controller 304, transmits the modulated signal to the  
19 fixed device 100 described in Fig. 1 through an antenna as an RF signal, and demodulates various  
20 signals received through the antenna so as to supply the demodulated signals to the third amplifier  
21 302.

1     **[0109]**     The third amplifier 302 amplifies a voice signal and various transceiving data to a  
2     predetermined level, and outputs the amplified signal and the data. The first amplifier 308  
3     amplifies a generated calling tone and a voice signal to a certain level in order to output the calling  
4     tone and the voice signal through the speaker 310, and the second amplifier 309 amplifies a user's  
5     voice signal inputted through the microphone 311 to a certain level in order to transmit the  
6     amplified voice signal to the fixed device 100 illustrated in Fig. 1 through the wireless modem  
7     301.

8     **[0110]**     The key input unit 307 has number keys for performing various function and dialing  
9     functions, and supplies a key input signal, inputted according to user selection, to the system  
10    controller 304.

11   **[0111]**    The RSSI detector 303 detects an RSSI signal or Receiving Signal Level Detect Output  
12    signal (that is, receiving field strength of a calling tone generating control signal transmitted from  
13    the fixed device 100 illustrated in Fig. 1), and supplies the detected RSSI signal to the system  
14    controller 304.

15   **[0112]**    The system controller 304 controls overall operation of the portable device 300, converts  
16    the analog RSSI signal to digital form in accordance with the calling tone generating control  
17    signal detected in the RSSI detector 303, and measures the distance to the fixed device 100 by  
18    comparing the converted digital signal with a value preset in the storage 306.

19   **[0113]**    The system controller 304 determines that the distance between the portable device 300  
20    and the fixed device 100 is more than a certain interval when a measured distance value is more  
21    than a preset reference value, and supplies a calling tone processing signal to the speaker 310 in

1 order to control generation of a calling tone.

2 [0114] However, if the measured distance value is less than the preset reference value, the  
3 system controller 304 determines that the distance between the portable device 300 and the fixed  
4 device 100 is less than the certain interval, that is, it determines that the fixed device 100 and the  
5 portable device 300 are located within a set distance of each other, and disables the generation of  
6 the calling tone. The system controller 304 includes an analog/digital (A/D) converter (not shown)  
7 for converting the level signal detected in the RSSI detector 303 into a digital signal, and a melody  
8 generator (not shown) for generating a melody when the fixed device 100 is located in a position  
9 separate from the portable device 300.

10 [0115] The storage 306 stores an ID of the portable device 300 and various programs, and  
11 temporarily stores various data generated while executing the programs under control of the system  
12 controller 304. In addition, a distance value to the fixed device 100 in accordance with an electric  
13 field strength value can be stored in a table by the calling tone generating control signal received  
14 from the fixed device 100.

15 [0116] The operation of an apparatus for processing a calling tone of a wire/wireless telephone  
16 in accordance with the present invention and having such a configuration will be more fully  
17 described with reference to Fig. 1 and Fig. 5.

18 [0117] First, when a ring signal is inputted through a local line connector of the fixed device 100  
19 shown in Fig. 1, the ring signal detector 101 detects whether the ring signal is inputted.

20 [0118] If the ring signal is detected in the ring signal detector 101, the detected ring detection  
21 signal is supplied to the system controller 102 of the fixed device 100.

1     **[0119]** The system controller 102 generates a high-chord (for instance, 40 chords) melody signal  
2     through a melody configuration unit (not shown) contained in the system controller 102 in order  
3     that a user can recognize that a ring signal is received according to the ring detection signal  
4     detected in the ring signal detector 101. The generated melody signal is supplied to the first  
5     amplifier 107. The first amplifier 107 amplifies the supplied high-chord melody signal to a certain  
6     level, and outputs the amplified signal through the speaker 111. Thus, the user can recognize the  
7     received ring through a high-chord melody sound outputted through the speaker 111.

8     **[0120]** The system controller 102 of the fixed device 100 generates a ring receiving generation  
9     control signal (ring receiving message) in order to transmit a ring receiving signal to the portable  
10    device 300, and supplies the ring receiving generation control signal to the third amplifier 109.

11   **[0121]** The third amplifier 109 amplifies the ring receiving generation control signal supplied  
12   from the system controller 102 to a certain level, and supplies the amplified ring receiving  
13   generation control signal to the wireless modem 110.

14   **[0122]** The wireless modem 110 modulates the ring receiving generation control signal  
15   amplified through the third amplifier 109 to form an RF signal through an internal RF transceiving  
16   module, and wirelessly transmits the modulated RF signal to the portable device 300 through an  
17   antenna.

18   **[0123]** As described above, the ring receiving generation control signal transmitted from the  
19   fixed device 100 is received by the wireless modem 301 through an antenna of the portable device  
20   300 illustrated in Fig. 5. The wireless modem 301 can include an RF transceiving module (not  
21   shown).

1     **[0124]**   The RF transceiving module of the wireless modem 301 demodulates the ring receiving  
2     generation control signal received from the antenna, and supplies the demodulated signal to the  
3     third amplifier 302.

4     **[0125]**   The third amplifier 302 amplifies the demodulated ring receiving generation control  
5     signal supplied by the RF transceiving module of the wireless modem 301 to a certain level, and  
6     supplies the amplified signal to the RSSI detector 303.

7     **[0126]**   The RSSI detector 303 detects an RSSI (Receiving Signal Level Detect Output) signal  
8     of the RF signal from the ring receiving generation control signal received through the third  
9     amplifier 302. In another words, the RSSI detector 303 detects a receiving electric field strength  
10    of the RF signal for the ring receiving generation control signal transmitted from the fixed device  
11    100.

12    **[0127]**   The detected RSSI signal is supplied to the system controller 304.

13    **[0128]**   The system controller 304 senses the distance between the fixed device 100 and the  
14    portable device 300 by using the RSSI signal, that is, an RSSI of the received RF signal supplied  
15    from the RSSI detector 303.

16    **[0129]**   Namely, the system controller 304 compares the RSSI detected in the RSSI detector 303  
17    with a reference RSSI prestored in the storage 306, and determines the distance between the fixed  
18    device 100 and the portable device 300.

19    **[0130]**   If the determined distance between the fixed device 100 and the portable device 300 is  
20    more than a preset reference distance, a melody generator inside the system controller 304 is  
21    enabled to generate a melody. The generated melody is supplied to the first amplifier 308,

1 amplified therein to a certain level, and outputted through the speaker 310. Simultaneously, the  
2 system controller 304 displays a ring receiving message on the display 305 so that the user can  
3 directly see that a ring is received. In this way, the user can easily confirm that a call is received.

4 [0131] However, if the distance between the fixed device 100 and the portable device 300 is less  
5 than the preset reference distance, the system controller 304 controls the generation of the melody  
6 by disabling the melody generator. While disabling the generation of the melody, the ring  
7 receiving message is displayed on the display 305 so that the user can confirm the received ring.

8 [0132] Hereinafter, a method of processing a calling tone of a wire/wireless telephone in  
9 accordance with the present invention corresponding to the above operation will be described  
10 through the flowchart of Fig. 6.

11 [0133] Fig. 6 is a flowchart of a method of processing a calling tone of a wire/wireless telephone  
12 in accordance with the present invention.

13 [0134] First, when the fixed device 100 shown in Fig. 1 is in a standby state (S201), it is  
14 determined whether a ring signal from the ring signal detector 101 is detected (S202).

15 [0135] If the ring signal is not detected through a local line, the fixed device 100 continuously  
16 checks as to whether the ring signal is received while maintaining the standby state. If the ring  
17 signal is detected, the system controller 102 of the fixed device 100 shown in Fig. 1 generates a  
18 bell sound or a melody sound as a calling tone during a ring-on time of the detected ring signal  
19 shown in Fig. 4 in order to inform the user of a ring receiving signal (S203).

20 [0136] While generating the calling tone, it is determined whether the ring-off time (idle period)  
21 shown in Fig. 4 is detected from the detected ring signal (S204).

1     **[0137]** If a ring signal idle period is not detected, the calling tone is continuously generated. The  
2     ring signal is received from the local line as shown in Fig. 4, and has ring-on and ring-off time  
3     periods, thereby generating a calling tone during the ring-on time period and stopping the  
4     generation of the calling tone during the ring-off time period. The operation of generation of the  
5     calling tone is repeated during the ring-on time period again, and thus the user can listen to a ring  
6     receiving sound.

7     **[0138]** However, in step S204, if the ring signal idle period is detected from the detected ring  
8     signal, wireless data for a ring receiving sound generation control signal is transmitted to the  
9     portable device 300 during the idle period of the ring signal by controlling the RF transceiving  
10    module of the wireless modem 110 (S205).

11   **[0139]** At this point, it is determined whether the hook switch 113 of the fixed device 100 is  
12   turned off (S206). If it is determined that the hook switch is turned off, transmission of the  
13   wireless data for the ring receiving sound generation control signal to the portable device 300 is  
14   disabled, and a call to a caller is made by connecting a speech path with the caller through the local  
15   line.

16   **[0140]** Then, it is determined whether the hook switch 113 is turned on during a telephone  
17   conversation (S208). If it is determined that the hook switch 113 is turned on, the call is completed  
18   to initialize the fixed device 100, that is, the fixed device 100 is converted into the standby state  
19   (S209).

20   **[0141]** On the other hand, if the hook switch 113 is turned on in step S206, the RF transceiving  
21   module of the wireless modem 301 of the portable device 300 receives the ring generation control



1 signal transmitted by the fixed device 100 (S210).

2 **[0142]** After that, the RSSI signal of the RF signal for the ring receiving generation control  
3 signal received through the RF transceiving module of the portable device 300 is detected by the  
4 RSSI detector 303 (S211). In another words, the RSSI detector 303 detects a receiving electric  
5 field strength of the RF signal for the ring receiving generation control signal transmitted by the  
6 fixed device 100.

7 **[0143]** The detected RSSI signal is supplied to the system controller 304. The system controller  
8 304 determines the distance between the fixed device 100 and the portable device 300 by using  
9 an RSSI supplied by the RSSI detector 303 (S212).

10 **[0144]** Then, it is determined whether the distance between the fixed device 100 and the  
11 portable device 300, as determined by system controller 304, is less than a preset reference  
12 distance (S213).

13 **[0145]** If the distance between the fixed device 100 and the portable device 300 is more than the  
14 preset reference distance (that is, if the distance between the fixed device 100 and the portable  
15 device 300 is more than the reference distance), a melody generator inside the system controller  
16 304 is enabled to generate a melody, and a ring receiving message is displayed on the display 305  
17 of the portable device 300 (S215).

18 **[0146]** However, in step S213, if the distance between the fixed device 100 and the portable  
19 device 300 is less than the preset reference distance, the melody generator is controlled to disable  
20 the generation of the melody and the ring receiving message is displayed on the display 305 of the  
21 portable device 300 (S214).

1   **[0147]**   An apparatus and a method for processing a calling tone of a wire/wireless telephone in  
2   accordance with the present invention control generation of a ring receiving signal by using ring-  
3   on and ring-off time periods of a ring signal received from the fixed device 100 of the  
4   wire/wireless telephone. However, the same method can be applied when a ring receiving  
5   generation control signal is transmitted to the portable device 300 from the fixed device 100  
6   regardless of the ring-on and ring-off time periods with a different method.

7   **[0148]**   The apparatus and the method for processing the calling tone of the wire/wireless  
8   telephone in accordance with the present invention automatically control whether a melody is  
9   generated according to a detected distance between the fixed device 100 and the portable device  
10   300 through an RSSI process. However, in another embodiment, manual controlling (that is,  
11   controlling the above operation according to user selection) will fall within the scope of the  
12   invention as will be evident to those skilled in the art.

13   **[0149]**   More specifically, automatic and manual modes are incorporated into the key input unit  
14   307 of the portable device 300 illustrated in Fig. 5 so as to perform a melody generation  
15   controlling operation according to user selection. In another words, if a user selects the automatic  
16   mode, the system controller 304 internally sets the automatic mode, and controls melody  
17   generation with the same method as in the above operation. Conversely, if the user selects the  
18   manual mode through the key input unit 307, a ring receiving melody is generated in the fixed  
19   device 100 and the portable device 300, regardless of an RSSI signal.

20   **[0150]**   For another manual mode function, the user can optionally use the key input unit 307 to  
21   select a reference distance between the fixed device 100 and the portable device 300 for storage

1 in the storage 306 of the portable device 300, thereby setting the reference distance.

2 **[0151]** In addition, in the above embodiment, the fixed device 100 is described as having a  
3 melody generator for generating a high-chord melody, and the portable device 300 is described as  
4 having a melody generator for generating a single-sound melody or a buzzer. However, in the  
5 present invention, it is possible to apply melodies generated in the fixed device 100 and the  
6 portable device 300, regardless of the melody types.

7 **[0152]** Finally, in the apparatus and the method for processing the calling tone of the  
8 wire/wireless telephone in accordance with the present invention, the fixed device 100 senses a  
9 ring signal when the ring signal is received through a local line connector of the fixed device 100,  
10 generates a single sound or a high-chord melody according to the sensed ring signal, and  
11 simultaneously transmits a ring receiving generation control signal to the portable device 300 as  
12 an RF signal.

13 **[0153]** The portable device 300 senses the electric field strength of the RF signal for the ring  
14 receiving generation control signal transmitted from the fixed device 100, and measures the  
15 distance between the fixed device 100 and the portable device 300 according to the sensed electric  
16 field strength. If the measured distance is less than a preset reference distance, the portable device  
17 300 disables generation of a melody, and the melody is generated in the fixed device 100 only.

18 **[0154]** In the apparatus and the method for processing the calling tone of the wire/wireless  
19 telephone in accordance with the present invention as described above, if an RF signal  
20 corresponding to a ring receiving generation control signal is transmitted to the portable device  
21 300 from the fixed device 100 after a ring signal is received in the fixed device 100 of the

1 wire/wireless telephone, the portable device 300 measures the distance between the fixed device  
2 100 and the portable device 300 according to electric field strength of the RF signal transmitted  
3 by the fixed device 100. If the measured distance is less than a preset reference distance, the  
4 portable device 300 disables generation of a melody and the melody is generated in the fixed  
5 device 100 only. Thus, when the fixed device 100 is near the portable device 300, only the fixed  
6 device 100 generates the melody for receiving a ring, thereby effectively solving the problem of  
7 user inconvenience caused by lack of harmony between melody chords generated in the fixed  
8 device 100 and the portable device 300.

9 **[0155]** Moreover, regardless of the kind of wire/wireless telephone used, the present invention  
10 selectively controls a melody sound according to the distance between the fixed device 100 and  
11 the portable device 300 so that a user can select automatic and manual modes. Therefore, it is  
12 possible to supply various functions of the wire/wireless telephone to satisfy customer  
13 requirements. As a result, advantages to the purchasing customer are achieved.

14 **[0156]** Although preferred embodiments of the present invention have been described, it will  
15 be understood by those skilled in the art that the present invention should not be limited to the  
16 described preferred embodiments. Rather, various changes and modifications can be made within  
17 the spirit and scope of the present invention, as defined by the following claims.